Spinal intradural arachnoid cyst

Spinal arachnoid diverticula are intradural cysts of the arachnoid membrane which communicates with the subarachnoid space. Characterized by a narrow rostral ostium, the diverticula may collect cerebrospinal fluid, empty incompletely with positional changes, and produce signs of spinal cord compression.

Intradural spinal arachnoid cyst is a rare lesion, occurring within the spinal subarachnoid space.

Etiology

Intradural arachnoid cysts may be congenital or may follow infection or trauma.

After epiduroscopic neural decompression ¹⁾.

There are a few case reports of intradural arachnoid cysts associated with syringomyelia, but recent evidence suggests that its occurrence is more common than previously thought. A combination of these two diseases is thought to be caused by blockage of cerebrospinal fluid (CSF) flow, which is also thought to cause adhesive arachnoiditis. For this reason, resection of the arachnoid cyst could improve the CSF flow and contribute to the shrinkage of syringomyelia².

Especially, idiopathic lesions, in which other possible etiological factors have been ruled out, seem to be rare.

see Idiopathic spinal intradural arachnoid cysts in children

Differential diagnosis

Cysticercosis³⁾.

It may be reasonable to include serum ELISA in the differential diagnosis of spinal intradural cystic lesions, particularly in cysticercosis endemic regions such as Korea⁴⁾.

The detection of an intradural cystic lesion through MRI leads primarily to a differential diagnosis of arachnoid cyst versus spinal cysticercosis, based on incidence. Moreover, other lesions, such as dermoid cysts, hydatid cysts, tuberculosis, sarcoidosis, and forms of subarachnoid neoplasia, have to be taken into consideration in the differential diagnosis of the disease ⁵⁾.

MRI is a sensitive diagnostic tool for the identification of cystic lesions in the spine; however, it is difficult to distinguish cysticercosis from a noninfectious cyst, such as an arachnoid cyst, without using gadolinium enhancement. Contrast-enhanced MRI is mandatory for evaluating spinal cysticercosis ⁶⁾

The wall of the arachnoid cyst does not appear enhanced, whereas that of the cysticerci are well enhanced in gadolinium enhanced MR images ⁷⁾.

The cyst walls were enhanced in all reported PSC cases. Moreover, the MRI sequence can distinguish

between the CSF like fluid of the arachnoid cyst and the protein-rich fluid of an infectious cyst ⁸.

Because arachnoid cysts have a low concentration of metabolites, similar to the CSF, the signal intensity is not increased relative to that of the CSF. On T2-weighted MR images, the signal intensity of neurocysticercosis is increased because of its higher protein content.

The experience with a case and the review of the published literature suggest that contrast-enhanced MRI may provide useful information in the differential diagnosis of spinal cystic lesions, especially in patients with an unusual clinical course ⁹.

Although MRI is the method of choice for the diagnosis of neurocysticercosis, particularly in the presence of calcification, computed tomography (CT) has an advantage compared with MRI ¹⁰.

The initial stage of cysticercosis is characterized by less tissue response. At this stage, CT shows areas of decreased density surrounding the lesion and does not have an advantage compared with MRI as a diagnostic method. At the final stage of the disease, the dead larvae have calcified, and CT shows multiple calcified nodules, which are best identified on CT compared with MRI ¹¹.

Treatment

Early treatment may correlate with improvement in radiological findings and neurological symptoms.

Case report

2015

A 69-year-old man with a spinal arachnoid cyst of the thoracic spine presented with gait disturbance. Magnetic resonance images showed a mild anterior displacement and flattening of the spinal cord at T4-T5. They performed ultrasonography before incision of the dura during the operation and observed the movement of the cyst consisting of not only pulsation in accordance with the cardiac cycle but also rhythmic expansion and contraction in accordance with the respiratory cycle. In the inspiratory phase, the cyst gradually expanded and pulsated in accordance with the cardiac cycle. In the expiratory phase, the cyst gradually contracted with the same pulsation. After resection of the cyst, the patient's neurological improvements were excellent. This is the first report of animated respiratory movement of a spinal arachnoid cyst visualized by intraoperative ultrasonography. Although cine magnetic resonance imaging can detect spinal intradural arachnoid cysts preoperatively, intraoperative ultrasonography is useful for close analysis of their movement and pathology. Considering the dynamic compression mechanism revealed in this study, the authors think that an early operation should be performed for such cysts ¹².

2014

Atypical intradural arachnoid cysts can be related to perineural injections and can cause symptoms of spinal stenosis. Its spontaneous vanishing is a very rare event, up to now reported by Mailleux et al.¹³.

Ishi et al. present the even-more rare case of an intradural arachnoid cyst associated with syringomyelia at the same spinal level.

The patient was a 66-year-old man who presented with bilateral leg numbness and gait disturbance. Magnetic resonance imaging (MRI) revealed an intradural arachnoid cyst located dorsal to, and compressing, the thoracic spinal cord at the level of the 7th thoracic vertebra (Th 7). In addition, syringomyelia existed at the level of Th 8, slightly caudal to the intradural arachnoid cyst. We dissected the cyst but did not perform any surgical procedures for the syringomyelia. Post-operative MRI showed that the cyst had disappeared and the syringomyelia had spontaneously shrunk. The patient was discharged with improvement in his numbness and gait disturbance. ¹⁴⁾.

2013

Occurrence of a spinal intradural arachnoid cyst after epiduroscopic neural decompression¹⁵⁾.

2012

Symptomatic spinal cord compression from an intradural arachnoid cyst with associated syrinx in a child ¹⁶⁾.

Animals

Fifty-seven dogs were included in the study. The most common type of surgery was durectomy (28 dogs) followed by marsupialization (11 dogs), durotomy alone (seven dogs), shunt placement (six dogs), and stabilization (five dogs). A higher proportion of intra-arachnoid shunt dogs became unable to walk in the immediate postoperative period (24 hours postsurgery) (4/6, 66%) compared to all dogs five of 57, 9% (2/7 durotomy alone, 3/28 durectomy alone). Of the nine dogs with immediate postoperative deterioration, seven had improved, walking without assistance, by 3 to 5 weeks postoperatively.

Clinical significance: This study does not identify an influence of surgical technique on short-term outcomes. Dogs with a thoracolumbar intra-arachnoid diverticulum that undergo a shunt placement are likely to deteriorate neurologically in the immediate 24-hour postoperative period but appear to improve by 3 to 5 weeks after surgery. Further work is required to evaluate whether one surgical technique is superior for preventing or reducing long-term relapse ¹⁷

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